



THE CITY OF SAN DIEGO

Fire and Life Safety Services

Sprinkler Policies Policy FS – 0208

High Rise Sprinkler, Standpipe and Fire Pump Requirements

I. The fire sprinkler system shall be designed in accordance with NFPA 13, 1999 Edition except as modified by San Diego Fire and Life Safety Services policy.

A. Each building floor shall be provided with an individual sprinkler control valve such that each floor can be independently controlled. The valves shall be monitored in accordance with Section 904.3 of the 2001 California Building Code. In addition, sprinkler flow switches shall be provided on each floor. The discharge from this drain will not be directly or indirectly into the storm drain. The preferable discharge is back into the onsite water supply.

II. The standpipe system shall be designed in accordance with NFPA 14, 2000 Edition except as modified by San Diego Fire and Life Safety Services.

A. When pressure reducing devices are required by NFPA 14 or this policy, a minimum 3 inch diameter galvanized drain pipe shall be provided for testing purposes. The drain shall be equipped with a 2 ½ inch inlet to allow 2 ½ inch diameter fire hose to be connected between the pressure reducing device and the drain. The sprinkler system test connections shall be connected to the drain.

B. Pressure reducing valves (PRVs) shall be required on all Class I standpipe outlets where the residual pressure exceeds 125 psi at 250 gpm. These PRVs shall be field adjustable in an emergency situation and the type shall be approved at plan review. Manufacturer's data sheets for these devices shall be submitted for plan review.

III. In accordance with the 2001 Edition of the California Building Code Section 403.2, a secondary onsite water supply shall be automatically available for the sprinkler system. The water supply shall be 20,000 gallons minimum or equal to the hydraulically calculated sprinkler system design demand plus hose allowance for a duration of 30 minutes, whichever is greater. The hose allowance shall be determined from NFPA 13, (i.e. 100 gpm for light hazard and 250 gpm for ordinary hazard).

A. The public water supply shall discharge directly into the water storage tank. Following are the requirements for the piping arrangement of the water storage tank:

i. Tank design shall allow a minimum 15 feet horizontal distance between the centerline of fill outlets and the centerline of the pump suction pipe. This distance is needed to reduce the effect of turbulence and aeration at the pump suction pipe, which could affect pump performance.

- ii. Provide at least two automatic and one easily accessible manual fill outlets to the tank. Size each fill outlet to independently supply makeup water at a rate not less than 150% of the pump rated capacity. Automatic fill valves should open when the water level reaches six inches below the full water line.
- iii. Automatic fill valves may be of the float, altitude, or other suitable design arranged for direct or pilot operation. Float valves of modulating type are preferred.
- iv. Provide pipe wells for the float valves extending to within six inches of the tank bottom, sized at least one inch in diameter larger than the float to ensure proper float valve operation and to facilitate valve testing. When pipe wells are used, provide valve pipe well drains for each pipe well at least four inches in diameter, located not more than two feet above the tank bottom arranged to discharge to a safe, frost-free location. For testing purposes and to make it impossible to close off the pipe wells, cut four 1 - ½ inch holes in each pipe well, located not more than one foot above the pipe well drains. Opening the drain valves will allow testing of float valves by draining water from the pipe wells faster than it can be replenished through the four 1 ½ inch holes in the pipe wells.
- v. To reduce turbulence and aeration, design and location of fill outlets shall meet the following criteria:
 - a. Pipe the fill outlets so that makeup enters the tank perpendicular to the tank water surface.
 - b. Locate fill outlets at the side of the tank opposite from the pump suction pipe, and a minimum of 15 feet (4.6 m) horizontally from the pump suction pipe.
 - c. The fill outlets may terminate at a height above the bottom of the tank that will have the least effect on turbulence and aeration. Fill outlets may extend to within 12 inches of the bottom of the tank.
 - d. Size the fill outlets so that water velocity at the maximum makeup water flow rate does not exceed 20 feet/sec. Use Table 1 to determine the minimum fill pipe size.

Pipe Size In.	<u>TABLE 1</u>	
	Maximum Discharge at 20 ft./sec. Water Velocity Gal./min.	Largest Allowable Standard Size Fire Pump Gal./min.
4	780	500
5	1225	750
6	1760	1000
8	3130	2000
10	4895	3000
12	7050	4500

- e. Provide a tank water level indicator visible to the fire pump operator.
 - f. Provide a low water level alarm in the tank, connected to a constantly attended location, to indicate when the tank water level drops to 9 inches below the full water line. This will signal the fact that more water is being pumped from the tank than is being replenished, allowing time to open the manual fill valve or to alert proper parties of this condition.
 - g. An anti-vortex plate shall be installed on the pump suction line within the water storage tank.
 - h. Provide a tank overflow outlet capable of discharging to a safe, frost-free location an amount of water no less than that which can be supplied by the fill mechanism. Size the overflow drainpipe at least one diameter larger than the fill pipe size given in Table 1. These features are shown on Figure 2, which is a typical piping arrangement that meets these requirements.
1. Provide a minimum 500 gpm rated fire pump. Add 250 gpm for each additional stair shaft over one. A separate fire pump will be required for each zone. The fire pump(s) shall be capable of providing 500 gpm for a single standpipe, plus 250 gpm for each additional standpipe at 100 psi residual at the highest standpipe outlet.
 2. All system components shall be U.L. listed or F.M. approved.
 3. The system pressures shall not exceed the listed pressure rating of the equipment used. In taller buildings, this may require location of fire pumps above ground level.
 4. All high rise buildings shall be equipped with a test header located adjacent to the fire department connection.
 5. Drafting connections are not required.

